

Vehicle Specification, Procurement and Maintenance Best Practices

Panelists

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Bus Specifications & Procurement



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Back to the Basics

- ❖ Create the Vision
- ❖ Develop the Fleet Plan – 5 years
- ❖ Draft Specification and Budget (ICE)
- ❖ Engage key stakeholders
- ❖ Determine funding sources (or financing)
 - ✓ Compliance
 - ✓ Record Keeping
- ❖ Determine type of Procurement RFP/IFB
- ❖ Document, Document, Document

Create the Vision

- Plan to Vision or a Vision to Plan?
 - Start with what you want not what you have.
 - Do not restrict yourself to past and current financial and operational practices.
- What will your fleet look like in five years, ten years?
- What does the operator and customer of the future look like and what can you do to attract them to your services?
- There is more money in search of Vision than Vision in search of money.



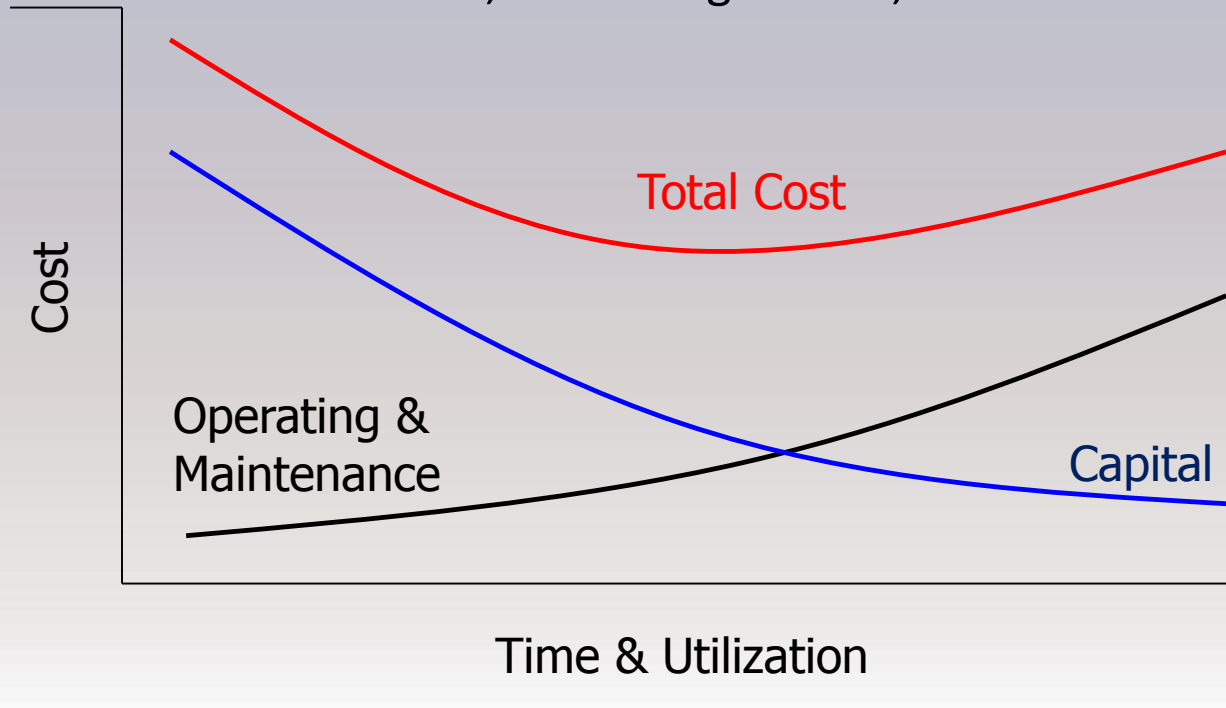
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Capitalize Operating

– Revenue & Non Revenue Fleets

- Bus and Rail Replacement and Overhaul Cycle
- Service Life, Technological Life, Economic Life



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TCO Capital vs. Operating

- How much do you pay for a bus after you pay for a bus?
 - A low purchase price does not mean the lowest total cost of ownership.
 - ✓ Fuel Economy
 - ✓ Maintenance
 - ✓ Inventory
 - ✓ Down Time
- For every \$1 of capital you will spend \$3 - \$7 in Operating expenses over the life of the vehicle. Spec drives value.
- When spending money will cost you money – balance your fleet procurement plan (1/5, 1/10, 1/12th)
- Be careful not to sacrifice the present for the future. (Accelerated replacement = future challenges)



Stakeholder MRS

Identification



Engagement



Maintenance

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Funding or Financing?

Funding

- Revenue sources at Federal, State, Local level.
- Taxes, fees, user charges.

Financing

- Tools used to leverage funding.
- Innovative financing.
- Think Intergenerational equity.

Regulatory Arbitrage

Using a different fund source to lower the total cost of procurement

A Fund source will often determine the cost of procurement and oversight.

- Federal Funding
- State Funding
- Local Funding



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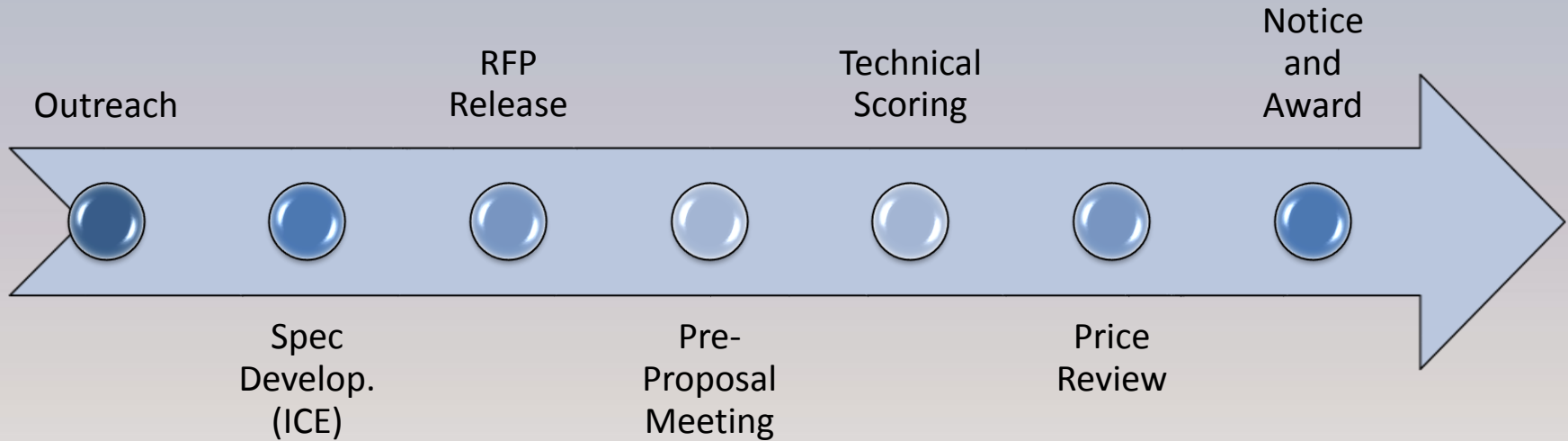
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Establish Procurement Parity

- ❖ Connecting the dots between who decides and who is responsible.....Who is the lead decision maker on specs and what is the result.... Procurement, operations, legal, finance.....Can they look beyond their own interpretations of regulations?

Department	Oversight
Procurement	Procurement Process
Legal	Compliance
Operations	Driver and Passenger Amenities
Maintenance	Everything Else

Timeline



90 – 180 Days

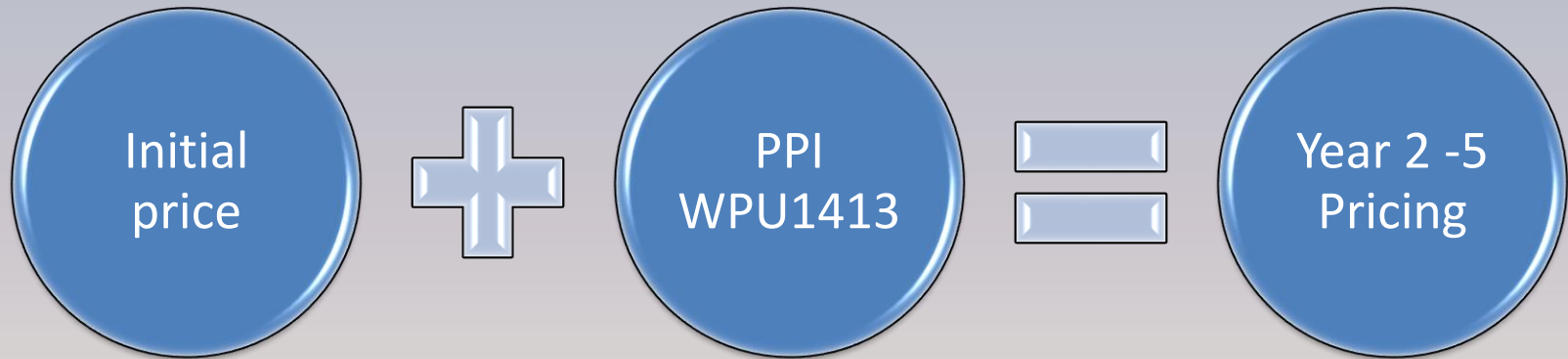
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Scoring for Value

Criteria	Scoring Weight
Technical – The Offeror’s compliance with the Technical Specification and the content of the Technical Proposal.	50%
Price – The Price Proposal presented	30%
Warranty – The initial warranty offering presented	10%
Delivery Schedule – The tentative dates for vehicle delivery of the base contract.	5%
Offeror’s Past Performance – The degree to which the Offeror has worked with procuring agencies with regard to bus manufacture, adherence to production and delivery schedules, resolution of warranty issues and fleet defects.	5%

Year over Year Cost Performance



Using an indexed inflation clause permits reasonable and customary price adjustments over time.

Vehicle Health Monitoring & Predictive Analysis

Al Pierce

Keolis Transit America

Director, Maintenance Las Vegas NV

Keolis

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What is Vehicle Health Monitoring ?

- Some of the best preventive maintenance tools we have at our disposal
- Ability to monitor critical aspects of bus system components in real time
- Historical data captured and retrieved in analytical format reporting
- Tailored to any fleet using variable Parameters

What are the benefits of VHM?

- Proactive maintenance and repair planning
- Increase preventive maintenance scheduling
- Improve quality of service
- Reduce bus down time
- Positive impact on budget
- Improve future bus specifications

Available Management Tools

- Technology advancements, GPS based real time on bus monitoring systems
- Maintenance management software, historical and trend analysis
- Fuel/fluid management systems
- Oil analysis – tried and true

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Predictive Analysis

- Utilizing all this data quickly and efficiently
- Real time information directly to maintenance
- Automated reporting
- Exceptions reporting

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Manage the Information

- Modify your PMI program
- Trend Analysis / Develop campaigns
- Update bus specifications
- Warranty administration
- Budget planning
- Use scarce resources wisely

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Implementing New Technologies

- Specify in new bus purchases
- Retro fit existing fleet
- Budgeted IT purchases
- Proper training
- Sufficient system size properly supported

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Making a Case for Investment

- Return On Investment analysis
- Benefits for maintenance service quality
- Improve maintenance productivity
- Justification supporting technology improvements on new bus purchases

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Using Technology Wisely

- Have a plan and know your requirements
- Choose proper technology for your application
- Capitalize on the investment

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MBTA Mechanical Directorate: Bus Fleet Replacement Practices Then and Now



Prior Replacement Cycle

- Past Bus fleet procurement approaches called for infrequent, large-scale orders
- Problems:
 - Lengthy procurement cycle/processes
 - Required a high-volume of vehicle inspections and preventive maintenance
 - Significant percentage of bus fleet required large scale Mid-life overhauls, and subsequent replacement all at once
 - Defects in an order affected a large number of units



Past Fleet Procurement Challenges

- Nova RTS (1994 – 1995)
 - 400 bus procurement
 - Large-scale fleet defects affected revenue service availability and reliability
 - Challenges:
 - Chronic wheelchair lift problems
 - Fuel pressure and engine cooling fan problems
 - Major structural issues with longitudinal beams
 - Unreliable engine balance shaft



Replacing the Nova Legacy Fleet

- After an 8 year gap in new fleet procurements (between 2003 and 2007), the Authority purchased 906 buses
 - 299 NABI 40' CNG
 - 193 Neoplan 40' ECD
 - 44 Neoplan 60' CNG
 - 32 Neoplan 60' DMA
 - 28 Neoplan 40' ETB
 - 310 New Flyer 40' ECD



Procurement Challenges

- Procurement of 299 NABI CNG Buses (2003)
 - Large-scale fleet defects
 - Challenges:
 - Substandard electrical wiring
 - Chronic wheel issues
 - Incorrect torque rod mounting bolts
 - Hydraulic steering and cooling problems
 - Inferior radiator
 - Paint adhesion problems
 - Known structural issues at window posts that would require replacement through a mid-life overhaul



NABI Mid-Life Overhaul Strategy

- A comprehensive fleet assessment determined the scope-of-work for a mid-life overhaul
- 124 units were sent to Mid-West Bus for renovation and reconstruction; 175 were refurbished in-house by MBTA staff
- Post-overhaul, the carbon steel structure has eroded, and is being repaired/replaced by NABI in year 10/11 of the fleet's life



Strategies for Breaking the Cycle

- In light of past experiences, Vehicle Maintenance and Engineering has advocated to spread large-scale procurements over a multi-year delivery
- Fleet procurement plan would replace 10% of fleet annually
- Benefits:
 - Delivery schedule is easier to manage
 - A standardized bus fleet brings about reduced costs
 - No more large-scale midlife overhauls; instead, move towards analytics-driven reliability improvement programs
 - MBTA can maintain an average fleet age of 7.5 years



Management Focus & Funding Challenges

- A state-of-good repair backlog, scarce capital funds, and legislation impacted procurement reform
- The Authority still has many 1994/1995 RTS buses operating in regular service, in addition to 586 buses that are due to be replaced within the next 3 years



Agency Focus and Funding Challenges

- As a result, the average fleet reached 8.6 years (well-above the 7.5 year target)
- Spring 2013: Capital funding was allocated by the Legislature
- Available funding jumpstarted a new, large-scale procurement process



Current Bus Fleet Plans

- Expedited the procurement of 60 new 40 ft Hybrid buses by Piggybacking off a ConnDot order (Delivery within 6 months)
- Issuing IFB for 325 40-ft CNG and Hybrid buses with options for an additional 200 units (planned this month)
- Preparing RFP for 44 articulated buses with options for an additional 32 units
- Preparing RFP for development of a dual-mode articulated bus for the Silver Line



Lessons Learned

- Fleet replacement cannot hinge on regular, small-scale state-of-good repair investments. Those were not forthcoming
- Infrequent, large-scale investments lead to infrequent, large-scale procurements. This is a self-perpetuating cycle.
- A Formalized Bus Fleet Management and Replacement Plan, established with buy-in from stakeholders, senior managers and policy makers allows for required financial planning to support proper maintenance planning and bus fleet replacement



Our Current Fleet Management Strategy

- MBTA is retaining the same engineering/consulting team used for prior procurements, that understands the agency's operations and environment
- The Vehicle Engineering team has intimate knowledge of the contracts, manufacturers, and potential challenges
- Assign experienced In- plant inspectors and pay close attention to known problem areas during manufacturing to mitigate problems and fleet defects
- Manage and stagger scheduled maintenance activities, mileage and route assignments



Lessons Learned / Life Cycle Cost



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Public Tender



A lot of rules and laws that can lead to buy the wrong product !

Many times in the past the company launched some public tenders with a lot of points from the award criteria on the price, sometimes even 90% of the points.

This works out to be **cheap** product for the company , but is this the best product and would it remain cheap when you look at it over a lifetime???

Introduction of Life Cycle Cost in the award criteria

LCC based on :

1. Analysis of several types of Maintenance plans
2. Spare parts pricing
3. Repair time comparison
4. Response time breakdown
5. Analysis from experienced technicians (seat disassembly)
6. Analysis of the used materials

Quick example

Driver's seat :

Past : 800\$ + the seat has to be replaced every 2,5 years

Now : 2000 + the seat has to be replaced after 8 years

Over 16 years :

Past = $6,4 \times 800 = 5120\$$

Now : $2 \times 2000\$ = 4000\$$

Lessons learned

Lessons learned from the past have shown that buying the best product on the market does not however mean that you will obtain best results while operating it.

Why?

We came to the conclusion that it is important to get an input from all the people who operate/ repair this product.

Try to get as much as possible input from company workers

- Who will be operating and repairing this product ?
- Which other input is important to end all discussions in the future?

For example for the driver's seat:

1. Drivers
2. Trade Unions!
3. Technicians
4. Ergonomic Specialists

Even if we buy the best seats in the world but the drivers don't like/want them, it will still remain a big issue.

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The inclusion of tests in the award criteria

A large amount of points from the award criteria was given for the feedback on the driver tests. (+/-3 months)

We asked the Trade Union to take the lead in organizing those tests for the drivers.



In this way, it will become harder for the Trade Union to claim afterwards that they were not satisfied with the choice the company made.

Input from in house technicians

This for the same reason as why we took the input from the drivers, but also and more important is the fact that we have over 50 years of experience in repairs

We listed, together with the technicians, all known problems based on our experience we acquired over the past. With this list we dismantled the proposed products and had a look to all parts that caused a problem in the past and see if there is any improvement made on those parts.



Avoid the same technical issues and buy something better than before

Ergonomics

An other important point is the ergonomic study, STIB include this in the award criteria.

This to avoid that the unions can come with a remark and asked themselves a repport to an ergonomics specialist and block an investement. This can lead to a los of investement and the whole procedure has to be done again.

Including a report from an ergonomist is very important but doing it together with the **unions** is more important and will block a lot of discusions.

Lessons Learned

Important award criteria :

1. Include as much as possible the union in the descissions (tests)
2. Not based on a price but based on an LCC
3. Ergonomic advise
4. Technical study made by in house technicians with experience

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Specification, Procurement, Lessons Learned, Predictive Analytics, and Life Cycle Cost

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